GLERL Review Wrap Up

Dr. Marie Colton
Director

US Department of Commerce, National Oceanic and Atmospheric Administration's
2010 Great Lakes Environmental Research Laboratory Review

North America's Freshwater Coast

Duluth

Alpena

Au Gres

Milwaukee

Toronto

Muskegon

Chicago

Ann Arbor

Detroit

Cleveland

Recapping your virtual tour of North America's freshwater coast

10,000 miles of shoreline

20% of freshwater on the planet - The Nation's greatest freshwater asset

C & T in the heartland "Highway H_2O"

What GLERL Does

- Freshwater / coastal ecology

- Stakeholder-driven, interdisciplinary ecosystem research

- Integrated ecological modeling and forecasting for the Great Lakes

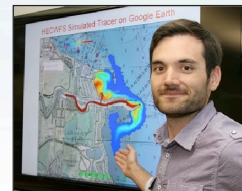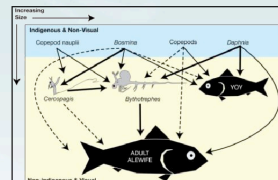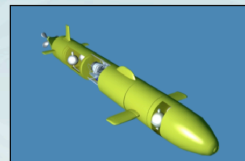From the requirements and drivers GLERL focuses on:
- Freshwater / coastal ecology – the only NOAA lab to do so and **anchor for NOAA Regional Collaboration team**
- Stakeholder-driven, inter-disciplinary ecosystem research
- Integrated ecological modeling and forecasting for the Great Lakes

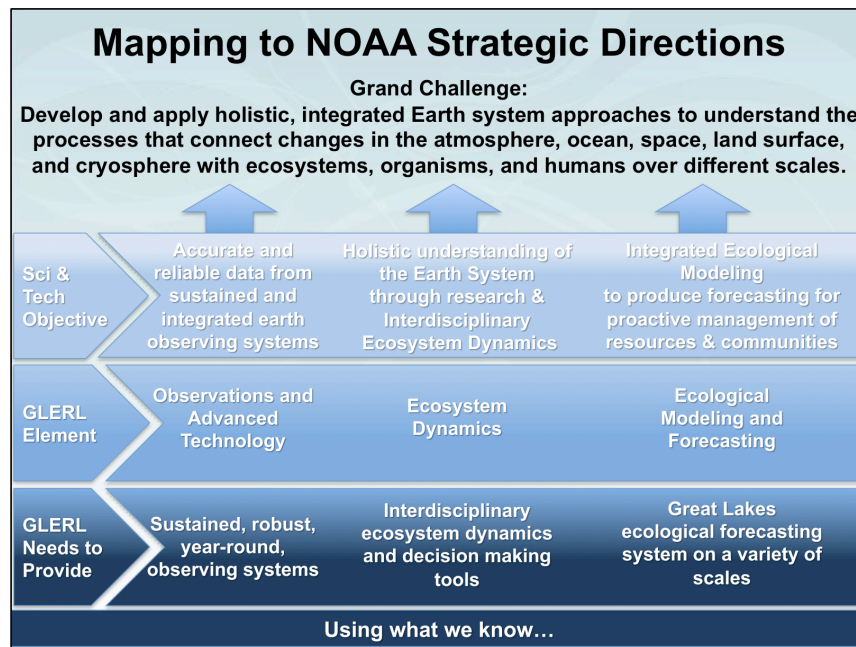Which support the NOAA mission and benefit Great Lakes communities

3

What have we learned?

- Now in an invasive species dominated ecosystem, we must think about holistic ecological approaches, including humans

- The Great Lakes need a sustained and robust year-round observing system, incorporating new technologies

- The Great Lakes ecology is complex, but the Lakes are an ideal test-bed for examining the full realm of possibilities for ecological forecasting

Point 3 + : Within a changing climate

4

Mapping to NOAA Strategic Directions

Grand Challenge:
Develop and apply holistic, integrated Earth system approaches to understand the processes that connect changes in the atmosphere, ocean, space, land surface, and cryosphere with ecosystems, organisms, and humans over different scales.

Sci & Tech Objective	Accurate and reliable data from sustained and integrated earth observing systems	Holistic understanding of the Earth System through research & Interdisciplinary Ecosystem Dynamics	Integrated Ecological Modeling to produce forecasting for proactive management of resources & communities
GLERL Element	Observations and Advanced Technology	Ecosystem Dynamics	Ecological Modeling and Forecasting
GLERL Needs to Provide	Sustained, robust, year-round, observing systems	Interdisciplinary ecosystem dynamics and decision making tools	Great Lakes ecological forecasting system on a variety of scales

Using what we know…

Working hard to get support for the Nation's freshwater ecosystem into the new NOAA Strategic Plan

5

NOAA Vision

Healthy ecosystems, communities, and economies that are resilient in the face of change need knowledge to make informed decisions.

GLERL Science → Service

- Interdisciplinary workforce strategy that includes social sciences and communication

- Research & Development infrastructure needs funds and an acquisition strategy

- Interdisciplinary science teams need long-term funding investments for maintaining expertise

- Performance management system recognizes new ideas, technology transfer, operational support, and communications

- Agile organizational structure

To summarize this section:
1) In order to achieve the NOAA Vision
2) How and where NOAA operates
3) What is needed:
GLERL scientists are recognized leaders in the community and communicate regularly with public.
From the "History" and "Pre-eminence" parts of this presentation, GLERL data indicate that
Science to service culture requires inter-disciplinary workforce strategy that includes social sciences and communication
GLERL scientists are productive, deliver results, and well-recognized as shown by several inter-related indicators of progress
Data from the Management section of this presentation indicate that
•*Service-type infrastructure needs acquisition strategy and funds in addition to research funding*
•*Interdisciplinary science teams need long-term funding source (appropriations) for maintaining expertise*
•*Science to service management system recognizes new ideas, technology transfer, operational support, and communications to produce high-performing organization and develop personnel*
GLERL has evolved over decades and continues to lead on Great Lakes science issues, now preparing to adapt again to its new "ecosystem"
Science organizations must be nimble enough to adapt to change

6

Technical Approach
Year-round observations - long-term and new technologies
Systematic performance management that recognizes and rewards multiple values needed to accomplish end to end developments
Executive Order (E.O.) 13423, Strengthening Federal Environmental, Energy, and Transportation Management, was signed on January 24, 2007, to strengthen key goals for the Federal Government.

1. Be NEW: New Idea In 2000 – The Shenehon was converted to B100 and showed immediate reductions in visible emissions, smoke, and offensive odor with unchanged performance in main engine or generator.
2. BE FIRST: Project Management Tech Transfer - This was the first federal vessel in the nation to operate on 100% biodiesel.
3. BE BETTER: Extend to robust operational system - 2005 – R/V Huron Explorer converted to the first petroleum-free vessel through use of B100 and biomotor, hydraulic, steering, and transmission oils. Not only was the fuel petroleum-free, but so were lubricants and all other oils.
4. BE SUSTAINING: Demonstrate Leadership in community - April 2006 - Department of Energy Award in recognition of GLERL leadership in Green Ship Initiative. In May, all three GLERL vessels transitioned to total petroleum-free underline operation.
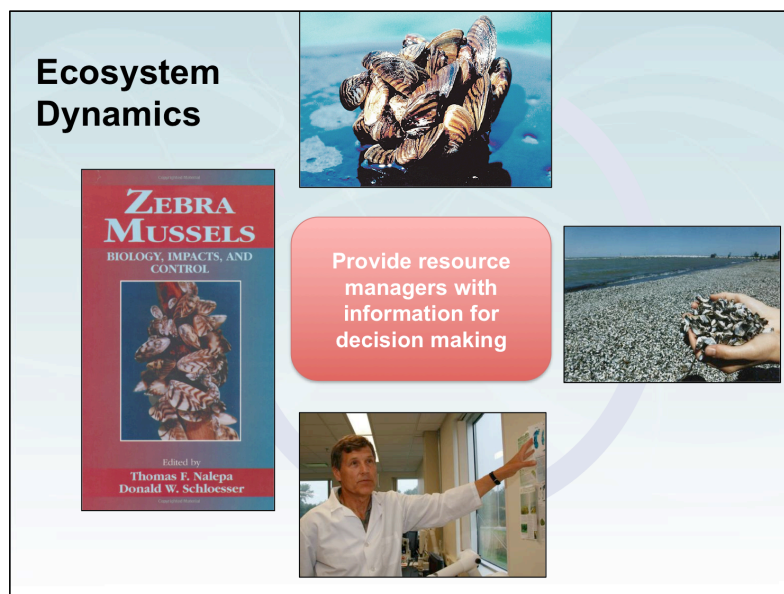
What's not an invader? Counter attach on invasives understanding moving from
Provide Resource Managers and Social Scientists with best ecosystem understanding for decision making
Tom Nalepa -

1. Be NEW: Study benthos in the Great Lakes as part of lower food web understanding and long-term observations program.
3. BE FIRST: He saw the change in the ecosystem others did not due to rapid growth in zebra mussels and recognized the need for resource managers to have information.
3. BE BETTER: Participated in workshops and worked with DNRE to inform fisheries management decisions
4. BE SUSTAINING: Became an expert and authored reference material on zebra mussels – working on a 2nd edition of his book.

Ecological Modeling and Forecasting

Ecological Forecasting System – predictive, proactive
HAB's,
Regional Ecological Forecasting Services
Current beach quality forecasts in the Great Lakes
1. Be NEW: Create wave and circulation models in the Great Lakes. Shallow water wave development and wind driven circulation
2. BE FIRST: Developed the Great Lakes Coastal Forecasting System using community developed models
3. BE BETTER: Put models together with health information to provide a new service
4. BE SUSTAINING: Get the information out to the public and resource managers.

9

Emerging Issue: Freshwater Resource Management

Water levels

Water Quality

HABs

Hypoxia

10

NOAA has a strong role to play in this issue because of it's mandate to predict and to "save lives and livelihoods".
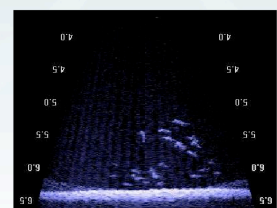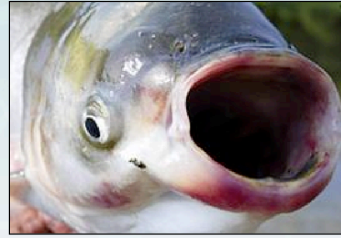
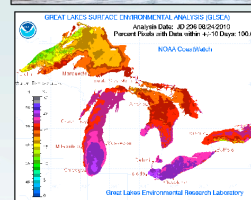# Emerging Issue: Ecosystem Engineering

Counterattack on Invasives

Putting humans back into the fight

Predators & Stewards : Prevention & Control

Emerging Issue: Climate Change

Regional Downscaling
   Water Levels
   Severe Weather
   Temperature Changes
   Ice Levels

Question:
What is the long-term impact of calcium sequestration in quagga mussel shells on Lake Chemistry?
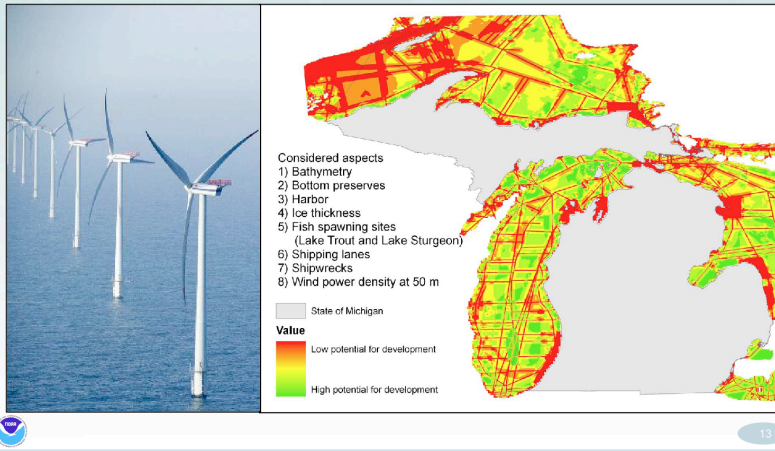
Economy, Environment & Energy

"Back to the Future"

Thank you to the Review Team and guests for participating in the 2010 GLERL Lab Review